IN THE SPECIFICATION

Please replace the paragraph at page 1, line 23 to page 2, line 6 with the following rewritten paragraph:

Another correction method is to provide a dummy pattern for reducing a difference in density between patterns. Still another correction method is disclosed in Japanese Patent Application Laid-Open No. 10-326010 (1998) (Document 1) (pp. 5-12, FIGS. 1-12). Document 1 describes that pattern data of a plurality of photomasks ~~photomask~~ is received at once, and the entire region of each photomask is subjected to a correction for the optical proximity effect in a photoresist. More specifically, an underlayer correction region is automatically extracted from the entire region of each photomask for making the optical proximity correction resulting from a base structure and material of the photoresist.

Please replace the paragraph at page 2, lines 7-15 with the following rewritten paragraph:

Such optical proximity correction, however, only corrects ~~is to correct~~ the mask pattern configuration of a photomask with regard to ~~for relieving~~ the optical proximity effect appearing in the range of the order of several micrometers. Thus, the conventional optical proximity correction does not ~~raises a problem that it is not possible to~~ correct the shift of a finished pattern after transfer and etching from a photomask pattern caused by the pattern density in the range of the order of several tens micrometers or greater. Correcting the shift of a transferred pattern from a photomask pattern caused by the pattern density in the range of the order of several tens micrometers or greater is hereinafter also referred to as pattern-density-induced correction.

Please replace the paragraph at page 3, lines 2-9 with the following rewritten paragraph:

According to one embodiment of the present invention, the method of correcting ~~manufacturing~~ a photomask includes: ~~the following steps (a) and (b). The step (a) is to make~~ calculating a first correction for correcting a configuration of a mask pattern of the photomask in accordance with: (i) a space between the mask pattern and an adjacent mask pattern thereto, and (ii) a desired configuration to be transferred from the mask pattern;[[.]] dividing the photomask into a plurality of regions; ~~The step (b) is to make~~ calculating a second correction ~~for dividing the photomask into a plurality of regions, thereby~~ correcting a configuration of a pattern of the photomask in accordance with an occupation rate of the mask pattern in each of the plurality of regions; and correcting said photomask based on said first correction and said second correction.

Please replace the paragraph at page 5, lines 14-25 with the following rewritten paragraph:

Now, the present embodiment will be described with respect to ~~taking the size of~~ a photomask ~~as that of a repeating unit~~ of a semiconductor device. FIG. 3 shows a photomask 3 according to the present embodiment. The photomask 3 is divided into m1 × m2 regions, e.g., 100 μm × 100 μm regions. Regions obtained by division will hereinafter also be ~~also~~ called mesh regions M. That is, the photomask 3 is divided into m1 × m2 mesh regions M. The occupation rate R of a mask pattern is calculated for each mesh region M. In the present embodiment, ~~description will be made on~~ the occupation rate R is described as the occupation rate of a gate pattern. However, ~~however,~~ the mask pattern according to the present invention is not limited to a ~~the~~ gate pattern. Here, the occupation rate R of the gate pattern represents a value obtained by dividing the area of a gate interconnect 2 in a mesh region M by the area

of the mesh region M. For instance, when a gate interconnect 2 occupies an area of 500 μm^2 in a 100 $\mu m \times 100$ μm mesh region M, the occupation rate R is calculated as 500/10000=5%.

Please replace the paragraph at page 6, lines 11-24 with the following rewritten paragraph:

FIG. 5 is a correction table according to the present embodiment. In the present embodiment, the correction based on ~~relying upon~~ the space S (the optical proximity correction) as described above and the correction based on ~~relaying upon~~ the occupation rate R (the pattern-density-induced correction) are combined together to generate the correction table as shown in FIG. 5. The range where the correction based on ~~relying upon~~ the space S has an effect is smaller than that where the correction based on ~~relying upon~~ the occupation rate R has an effect. The correction table can be obtained through experiments or simulations. Based on the correction table, the mask pattern configuration of the photomask 3 is corrected to form a gate interconnect 2 having a desired gate width L. For instance, when the occupation rate R in a mesh region M is 8% and the space S is narrower than S11, the amount of correction is +L11. The mask pattern configuration of the photomask 3 in the mesh region M is corrected by this amount of correction. When the occupation rate R in another mesh region M is 45% and the space S is wider than S43, the amount of correction is -L43.

Please replace the paragraph at page 6, line 25 to page 7, line 9 with the following rewritten paragraph:

In the case where the pattern of a gate interconnect 2 occupies ~~is occupied by~~ four mesh regions M as shown in FIG. 6, ~~there is a method of determining~~ the amount of correction may be determined simply from the occupation rate R of each of the mesh regions

M. ~~and the like, but~~ However, in an alternative embodiment, the amount of correction of the respective mesh regions M may be averaged to determine the amount of correction of each of the mesh regions M ~~based on the average value~~. Specifically, the amount of correction for each of mesh regions M11, M12, M21 and M22 shown in FIG. 6 is first obtained from the correction table. The obtained amounts of correction are averaged to determine the amount of correction for each of the mesh regions M11, M12, M21 and M22 ~~based on the average value~~, thereby correcting the mask pattern configuration of the photomask 3.

Please replace the paragraph at page 7, lines 10-20 with the following rewritten paragraph:

The method of correcting ~~manufacturing~~ the photomask according to the present embodiment as described includes calculating a first correction for correcting the configuration (or dimensions) to be transferred from a mask pattern in accordance with: (i) the space between the mask pattern and an adjacent mask pattern thereto, and (ii) a desired configuration (or dimensions) of the mask pattern; ~~and~~ dividing the mask pattern into a plurality of regions; ~~and~~ calculating a second correction ~~for dividing a photomask into a plurality of regions~~ for correcting the pattern configuration of the photomask in accordance with the occupation rate of a mask pattern in each of the plurality of regions; and correcting said photomask based on said first correction and said second correction. This enables not only ~~the~~ correction of ~~for~~ the optical proximity effect appearing in the range of the order of several micrometers, but also the pattern-density-induced correction in a greater range may be made. Thus, a semiconductor device can be manufactured with higher dimensional accuracy.

Please replace the paragraph at page 7, line 25 to page 8, line 3 with the following rewritten paragraph:

Furthermore, according to the method of the present embodiment, the correction is made based on the correction table generated in accordance with the occupation rate, allowing a ~~the~~ photomask 3 of various patterns to be corrected rapidly. Thus, photomask manufacture can be performed efficiently ~~effectively~~.

Please replace the paragraph at page 8, lines 4-9 with the following rewritten paragraph:

Still further, when a mask pattern occupies ~~is occupied by~~ a plurality of regions, the amount of correction ~~occupation rate~~ of the mask pattern in each ~~the~~ respective region ~~regions~~ is ~~shall be~~ the average of the amount of correction ~~occupation rates~~ of the mask pattern in each ~~the~~ respective region ~~regions~~ occupied by ~~occupying~~ the mask pattern. Thus, the method of the present embodiment can correct ~~relieve~~ influences exerted by the mask pattern in adjacent regions, allowing the mask pattern configuration of the photomask 3 to be corrected more precisely.

Please replace the paragraph at page 10, lines 8-14 with the following rewritten paragraph:

As described, according to the method of the present embodiment, the optical proximity correction and the pattern-density-induced correction are made independently to correct the mask pattern configuration of the photomask 3. Thus, when a change in any of the process variables ~~or the like~~ requires a modification of the amount of correction, ~~either~~ the amount of either the optical proximity correction or ~~and~~ pattern-density-induced correction

that requires [[a]] modification may ~~only~~ be independently recalculated and modified. This allows ~~an operation for~~ changing process variables ~~or the like~~ to be simplified.

Please replace the paragraph at page 11, line 18 to page 12, line 1 with the following rewritten paragraph:

Next, FIG. 9 illustrates the photomask 3 divided into m21 × m22 mesh regions M. An m21 × m22 mesh region M is a region that is affected by factors causing a shift of a finished pattern due to the pattern density in an etching step of the photomask 3. For instance, the m21 × m22 mesh region M is of 200 μm × 200 μm size, which is a range where the finished pattern is shifted due to the pattern density when etching chromium, which serves as a light shielding film for the photomask 3. Variations in material[[,]] and other process variables ~~and the like~~ cause variations in a range where the finished pattern is shifted due to the pattern density, which is a correction factor. This requires an optimum size to be selected for a mesh region M for each correction factor.

Please replace the paragraph at page 14, line 21 to page 15, line 4 with the following rewritten paragraph:

For a mesh region M described in the third preferred embodiment, an optimum size is selected for each correction factor. Here, an optimum size means a range where the pattern density as a correction factor causes the shift of a transferred pattern from a photomask. In contrast, in the present embodiment[[,]] the mesh region M is further divided into regions (hereinafter also referred to as sub-mesh regions MS) of size smaller than an optimum size. FIG. 11 illustrates the photomask 3 divided into mesh regions M of an optimum size of m3 × m4 (a mesh region M being indicated by a bold line). Further, as shown in FIG. 11, an m3 × m4 mesh region M is divided into m31 × m41 sub-mesh regions MS.

Please replace the paragraph at page 15, lines 5-20 with the following rewritten paragraph:

Next, the occupation rate R of a mask pattern in a sub-mesh region MS is calculated. In the present embodiment, the occupation rate R in each sub-mesh region MS is not merely calculated, but the average of occupation rates R in sub-mesh regions MS adjacent to a sub-mesh region MS, which is a target of calculation, is obtained as the occupation rate R of the target sub-mesh region MS. A sub-mesh region MS22 having a gate interconnect 2 will be specifically described in reference to FIG. 11. The occupation rate R in the sub-mesh region MS22 is the average of the respective occupation rates R in sub-mesh regions MS11, MS12, MS13, MS21, MS23, MS31, MS32 and MS33 adjacent to the sub-mesh region MS22. The occupation rate R in all the sub-mesh regions MS can be determined by the above-described average value. Then, the pattern configuration of the photomask 3 is corrected as described in the first to third preferred embodiments based on the occupation rate R of the sub-mesh regions MS. In <u>one embodiment of</u> the present invention, the average of occupation rates R in mesh regions M adjacent to a mesh region M, which is a target of calculation, may be determined as the occupation rate R of the target mesh region M without dividing the target mesh region M into sub-mesh regions MS.